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Case Docket No. 7170
Date: October 23, 2007

Mail Stop Appeals - Patents
COMMISSIONER OF PATENTS
PO Box 1450
Alexandria, VA 22313-1450

Re: Application of: Miele
Serial No.: 10/647,917
Filed: August 26, 2003

Art Unit: 1774
Examiner: DIXON, Merrick L.

For: LOW EMISSION FIBROUS MATS HAVING HIGH HOT STRENGTH

Transmitted herewith is/are the following document(s) related to the above-identified application:

- ☐ Notice of Appeal
☒ Appeal Brief (29 pages)
☐ Request for Oral Hearing

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Miele

Art Unit: 1774

Serial No. 10/647,917

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Filed: August 26, 2003

Examiner: Merrick L. Dixon

October 23, 2007

For: LOW EMISSION FIBROUS MATS HAVING HIGH HOT STRENGTH

Commissioner of Patents and Trademarks
Washington, D. C.

Dear Sir:

10/25/2007 PCHOMP 00000004 100625 10647917
01 FC:1402 510.00 DA

In response to the Final Office Action mailed on June 4, 2007, and the Advisory Action mailed July 11, 2007, applicants appealed the final rejection of claims 1-13 in the application.

Appeal Brief

I. Real Party In Interest

The real party in interest is Johns Manville International, Inc. a corporation duly organized under and pursuant to the laws of the state of Delaware and having its principal place of business in Denver, CO, assignee of the inventor Miele in the parent application S.N. 10/647,917.

II. Related Appeals and Interferences

None

III. Status of the Claims

Claims 1-13 stand finally rejected, and are the subject matter of this appeal. Claims 14-19 have been cancelled.

IV. Status of Amendments:

A Rule 1.116 Amendment filed on June 27, 2007, was entered. In an Advisory Action mailed on July 11, 2007, it was stated that this amendment overcame the rejection under 35 USC 112, second paragraph in the Final Rejection, but was not persuasive or sufficient to overcome the Final Rejection under 35 USC 112, first paragraph, and rejections under 35 USC 103.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER:

The only independent claim, claim 1, describes a nonwoven fibrous mat having a basis weight in the range of about 50 – 225 grams/square meter (see the last sentence of first paragraph of the Brief Summary of the Invention on page 3 of the specification)

fibers in the fibrous mat consisting essentially of polymer fibers (first paragraph of page 1 and the first paragraph of page 5 of the specification)

bound by about 16-30 wt. percent (first sentence of first paragraph of the Brief Summary of the Invention on page 3 of the Specification), based on the dry weight of the mat, of a formaldehyde containing polymer resin latex binder (second sentence

of the first paragraph of the Brief Summary of the Invention on page 3 of the specification), the polymer of the polymer resin latex binder being selected from a group consisting of ethylene-vinyl acetate copolymer, styrene-acrylic copolymer, vinyl-acrylic copolymer, styrene-butadiene-acrylonitrile copolymer, acrylic copolymer prepared by emulsion polymerization of one or more acrylic ester monomers including ethyl acrylate, methyl acrylate, methyl methacrylate, butyl acrylate, 2-ethyl hexylacrylate, hydroxyethyl acrylate, hydroxypropyl acrylate, and hydroxyethyl methacrylate; acrylamide or substituted acrylamides, butadiene, styrene, acrylonitriles, vinyl acetate or other vinyl esters; carboxylic acid monomers or ethylenically unsaturated anhydrides capable of generating carboxylic acids, (see the second sentence of the first paragraph of the Brief Summary of the Invention on page 3 of the specification through the end of that paragraph and the last paragraph on page 5 of the specification),

the binder containing a bisulfite compound providing a hot strength in the mat, at 200 degrees C., of no more than about 1 percent elongation, in the machine direction (see Example 3 on page 7, and the last sentence of the first full paragraph on page 8 of the specification), the binder containing at least about 1.25 wt. percent and up to about 7.5 wt. percent of the bisulfite compound, based on the dry weight of the formaldehyde containing resin in the binder (see the first sentence of the second paragraph of the Brief Summary of the Invention on page 3 of the Specification, Example 3 on page 7 and Table 2 on page 9 of the specification).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL:

a) Claims 1-13 stand finally rejected under 35 USC 112, first paragraph, as failing the written description requirement for the term "consisting essentially of polymer fibers".

In the Final Office action the Examiner states that the term "the fibers in the fibrous mat consisting essentially of polymer fibers" is not described in the

specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor, at the time the application was filed, had possession of the claimed invention and that the specification does not provide any teaching or discussion of fibers consisting essentially of polymer fibers or its usage with the claimed nonwoven fibrous mats.

b) Claims 1-13 stand finally rejected under 35 USC 103(a) as being unpatentable over Chang et al (US 5,914,365) in view of Taylor et al (US 5,578,371). In the Final Office Action the Examiner urges that Chang et al teaches the basic claimed invention including polymer fibers in the form of a mat comprised of polymer fibers such as acrylic, polyamide, or polyester fibers amounting to 50-97 percent of the mat, col. 6, lines 55-68, the polymer fibers being bonded by a specific amount of a formaldehyde latex binder, col. 6, lines 10-15 and 45-50. Re claims 2 and 8-10, the Examiner urges that Table 2, Examples 2 and 3, col. 2, lines 20-45 and col. 7, lines 40-45 teach using similar compositions having similar properties such as acrylic copolymers and SBR (embracing acrylonitrile, a rubber of SBR) and SMA employed with the binder. The Examiner acknowledges that Chang et al do not teach using a bisulfite compound, but that Taylor et al teaches urea or phenol formaldehyde binder compositions for bonding fibrous mats, these binder compositions containing a bisulfite such as ammonium sulfite, see the Abstract, col. 3, lines 24-35 and line 60 thru col. 4, line 19 and lines 27-68, col. 6, lines 23-30, and re claims 3-10, see col. 4, lines 27-65, and re claims 4-8 and 11, see Table 1. The Examiner urges that in view of these disclosures, it would have been obvious to one having ordinary skill in the art to have modified the binder composition of Chang et al to include a bisulfite because Taylor et al teaches that the incorporation of a bisulfite reduces the total emissions released from the binder.

c) Claim 2 stands finally rejected under 35 USC 103(a) as being unpatentable over Chang et al in view of Taylor et al and further in view of Hummerich et al (US 6,071,994, for the reasons stated in (b) just above and further because Hummerich

et al teaches that it is known to utilize acrylic copolymer material and styrene in binder compositions, col. 2, line 52, col. 3, lines 1-22, and lines 50-60, col. 5, lines 14-21, col. 6, lines 15-20, col. 9, lines 30-44 and col. 10, lines 20-45. It is urged that the reference also teaches its binder mixed with formaldehyde at col. 9, lines 50-68 and col. 10, 9-13. The Examiner further stated in the Final Office Action that it would have been obvious to one having ordinary skill in the art to have modified the combination (the teachings of Chang et al and Taylor et al) to include the resins as claimed because Hummerich et al teaches they provide short drying times and high strength as cited above.

d) Claims 8-10 stand finally rejected under 35 USC 103(a) as being unpatentable over Chang et al in view of Taylor et al and further in view of Nishibara et al (US 5,178,706), for the reasons set out in (b) above and further because the Examiner urges that Nishibara et al teaches SBR and acrylonitriles are well known rubbers for polymer fibers, see col. 2, lines 20-65. The Examiner urges that it would have been obvious to one having ordinary skill in the art to have recognized the combination of resins as claimed (SBR acrylonitrile types) because Nishibara teaches it is well known such SBR Acrylonitrile types are alternatives for polyester fibers, see the Abstract and col. 2, lines 20-65. The Examiner further stated in the Final Office Action that it would have been obvious to one having ordinary skill in the art to have recognized the combination resins as claimed (SBR acrylonitrile types) are as Nishibara teaches well known alternatives for polymer polyester fibers (Abstract, col. 2, lines 20-65).

VII. ARGUMENTS:

a) Re: VI (a) - Rejection of Claim 1 Under 35 USC 112, first paragraph and

Objection under 35 USC 112, first paragraph.

Claims 1-13 stand rejected under 35 USC 112, first paragraph, as failing to comply with the written description requirement, the Examiner urging that the specification does not provide any teaching of fibers consisting essentially of polymer fibers. This rejection is traversed, applicant believing that the Examiner is in reversible error in this conclusion and respectfully requests the Board to reverse this rejection.

The term "the fibers consisting essentially of polymer fibers" means, in well established usage of "consisting essentially of" that the fibers in the mat contain only polymer fibers and only possibly other trace, contaminate, or incidental things having no material effect on the characteristics of the inventive mats. The specification, in describing the claimed mats, describes the fibers in the mats only as being polymer fibers, e.g. see the first paragraph of page 1, the first sentences of the first and second paragraphs of the Summary of the Invention, the second sentence of the first paragraph of the Detailed Description of the Invention, the paragraph immediately preceding Example 1, all of the Examples and the original claims. This commonly used term, "consisting essentially of" was inserted into claim 1 to align the claims with the disclosure, which speaks only of polymer fibers, and to exclude the glass fibers and glass fiber mats and blankets taught by Chang et al and Taylor respectively.

The Examiner stated in the Final Rejection that "independent claim 1 does not have the proper support in the original specification as filed because the specification does not provide any teaching or discussion on fibers consisting essentially of polymer fibers or its usage with Applicant's claimed nonwoven fibrous mat. See the Instant Examples, no weight percentages of polymer fibers are mentioned, nor any language implying a high percentage of polymer fibers are employed, nor any discussion of non-poly mer fibers and their respective amounts" (emphasis added). Further, in the Advisory Action, under Continuation of 11, line 5, the Examiner again

agrees that there is no mentioning in the specification of non-polymeric fibers. The Examiner further states that because of this 35 USC 112, first paragraph rejection, the term in claim 1 of "consisting essentially of polymer fibers" is "being construed as equivalent to comprising".

Applicant believes that the above cited admissions of the Examiner, and the other reasons given in the rejection, including treating the term "consisting essentially of" as equivalent to "comprising" are all errors. Applicant mentioned no non-polymer fibers in the specification because the invention does not apply to non-polymer fibers. There is no requirement in 35 USC 112 that the applicant must describe in the specification everything that the invention does not contain. Further, the Examiner's urging that the Examples do not disclose the percentages of polymer fibers is not correct. The 3 Examples all use the same starting polyester spunbonded mat was made in a known manner such as the process described in U. S. Patent No. 4,125,663 the disclosure having been incorporated into the specification by reference. Spunbonded webs, nonwoven fibrous webs of polymer fibers, are well known in the art. This U.S. Patent No. 4,125,663, teaches a spunbonded web consisting of polyester filaments (fibers) as shown by the first 4 lines of the Abstract, claim 1 and elsewhere in the specification. The amount of binder and bisulfite (Example 3) is disclosed and the remainder of the mat would be the polymer fibers. There is no suggestion of anything else in the polyester spunbonded web or the resultant fibrous mats.

For these reasons applicant believes that the present specification teaches to the ordinary skilled in the art a nonwoven fibrous mat having - - - - fibers in the fibrous mat consisting essentially polymer fibers bound by - - - -, and respectfully asks the Board to reverse this rejection made under 35 USC 112, first paragraph.

b) Re: VI (b) – Rejection of Claims 1-13 under 35 USC 103(a)

The Examiner has rejected these claims as being obvious in the sense of 35 USC 103(a) under the teachings of Chang et al in view of the teachings of Taylor et al. Applicant believes that this rejection is in error and respectfully requests the Board to reverse this rejection.

The claimed invention addresses a problem very different than the problem addressed by Chang et al. As described in the last paragraph of the Background in the Specification, the problem dealt with by the claimed invention was to achieve resin bound nonwoven fibrous mats, the resin containing formaldehyde and having low formaldehyde emissions during the drying and curing operation of manufacturing the mats and when contacted with hot asphalt in the manufacture of roofing products, the resin binder also producing good hot strength, Thermal Dimensional Stability (TDS) in the mats such as no more than 1 percent elongation at 200 degrees C. under a tensile stress, see TDS results for Example 3 in Table 1 on page 7 and the discussion of TDS beginning at the bottom of page 7 and extending to the bottom of page 8 of the specification.

Contrastingly, Chang et al teach nonwoven fibrous mats, preferably glass fiber mats, see col. 1, lines 1-2 and 22-23, col. 2, lines 36-39 and 55-56, col. 3, lines 34-47 and all of the Examples, containing a modified thermosetting urea formaldehyde resin binder composition for achieving improved tensile properties, specifically enhanced wet tensile (tensile after soaking in water having a temperature of 85 degrees C. for 10 minutes), wet mat strength and dry tensile strength. Please note that Chang et al never discusses or measures the hot tensile strength and Thermal Dimensional Stability that is critical in polymer fiber mats. Therefore, the problem(s) addressed by the present invention and those addressed by Chang et al are critically different.

Now it will be seen that the solution of the invention and the solution taught by Chang et al are also critically different. In the present invention, the problem of low hot strength and formaldehyde emissions when impregnated with hot asphalt is solved by bonding the polymer fibers with a combination of about 16-30 wt. percent of formaldehyde containing polymer resin latex binders and about 1.25 to about 7.5 wt. percent of a bisulfite compound, based on the weight of the formaldehyde containing resin in the polymer latex binder. The formaldehyde containing polymer can be of various types as described in lines 6-13 of claim 1 and it will be recognized by polymer chemists of ordinary skill that all of these polymers are thermoplastic.

Contrastingly, the solution taught by Chang et al for a critically different problem with a significantly different kind of mat, is to use a thermosetting urea formaldehyde resin binder modified by the addition of a water soluble styrene-maleic anhydride copolymer, see col. 1, lines 12-14 and col. 2, lines 48-54.

Thus the Chang et al reference teaches a different solution for a different problem with a different type of fibrous nonwoven mat, i. e. one made from glass fibers, and as such cannot make the claimed invention obvious to one of ordinary skill in the art. This situation is not changed by combining the teachings of Taylor et al with those of Chang et al.

The teachings of Taylor do not reasonably suggest modifications to the Chang et al teachings to arrive at the claimed invention. Taylor et al teach making fiber glass insulation batts, col. 8, lines 36-37, by adding a bisulphate to a urea modified, phenol formaldehyde thermosetting resin binder and spraying that binder onto hot glass fibers about 12 inches below a spinning machine used to make the fibers, and the binder just described, see col. 4, lines 60-63. The fiber glass product made in the Examples of Taylor et al are insulation batts and insulation mats, note the "recovery" data and explanation in col. 8, lines 25-26 and 31-34. These products are

very different than the formaldehyde containing polymer bound polymer fiber mats of the claimed invention, mats having hot strengths suitable for making roofing products in which the mats are subjected to hot asphalt up to about 200 degrees C. while being run through a manufacturing line at high speeds, see Table 1 and page 7 through page 8, line 31 of the present specification. As described above, verified by the testimony of Michael Fay, an expert in fiber glass wool insulation products and processes, in the attached Rule 1.132 Declaration, and further verified by the attached Exhibit, pages 24-27 of FIBER GLASS BY Mohr and Rowe, the fiber insulation products taught by Taylor et al contain completely different types of fiber, very different amounts of very different binders. Such products have very little strength and are both unsuitable and unused for making roofing products by impregnating with hot asphalt at high speeds such as is the primary application of the mats of claims 1-13.

More importantly, Taylor et al teach using the urea modified, phenol formaldehyde resin binders and particularly because of the criticality of this type of resin and particularly the critical steps of preparing as disclosed in col. 4, lines 14-18, applicant believes that it would not be obvious to one of ordinary skill in the art to add bisulfite to the binder of Chang et al and also to change the urea formaldehyde thermosetting resin used by Chang et al to the polymer containing formaldehyde resins of the claimed invention. The teachings in Taylor et al, particularly at col. 3, lines 27-34 (to phenol formaldehyde binders), col. 4, lines 14-18 (criticality of the forming method of the resins) and col. 4, lines 59-61, and col. 6, lines 17-22 (applying to hot, most likely hundreds of degrees F., glass fibers) do not teach that a bisulfite will produce the same result when present with any polymer containing formaldehyde and regardless of the type of fibers or the temperature of the fibers when applied. Chemistry is often unpredictable especially polymer chemistry and Taylor et al certainly do not teach that the type of formaldehyde containing resin is not important to the use of a bisulfite, or that the a bisulfite would reduce

formaldehyde emissions on the type of polymers in the claimed fibrous mats when subjected to hot asphalt.

In summary re Taylor et al, this reference teaches a very different product containing very different fibers and binders and made by a very different process and therefore would not reasonably lead one of ordinary skill to modify Chang et al in such a manner as to obtain the claimed invention, except in hindsight using applicant's own disclosure as a roadmap and template. For these reasons, there is no reasonable teachings or suggestions in either Chang et al or Taylor et al that would lead one of ordinary skill in the art to modify the teachings of either Chang et al or Taylor et al or any reasonable combination to achieve the presently claimed nonwoven fibrous mat products having the compositions and properties recited in the claims. The combined teachings of Chang et al and Taylor et al do not produce the claimed invention. For these reasons applicant believes that this rejection under 35 USC 103(a) is in error and that the Board should reverse this rejection.

c) Re: VI (c) – Rejection of Claim 2 under 35 USC 103(a)

Claim 2 further limits the formaldehyde containing polymer to a formaldehyde fortified latex polymer, the polymers selected from a group consisting of ethylene-vinyl acetate copolymer, styrene-acrylic copolymer, vinyl-acrylic copolymer, styrene-butadiene-acrylonitrile copolymer, and acrylic copolymer.

The impropriety of the rejection under 35 USC 103(a) based on the combination of the teachings of Chang et al and Taylor et al are set out in the section just above and are again relied on against this rejection of claim 2. The Examiner stated that in addition to the combination of teachings of Chang et al and Taylor et al, this claim is obvious in view of the additional teachings of Hummerich et al.

Hummerich et al teach formaldehyde free, thermosetting binders, see col. 1, lines 1-15, particularly lines 1-2, col. 2, lines 12-25, col. 8, line 42 and col. 10, lines 41-45, particularly line 42 (thermoset matrix) and therefore do not teach the binder used in the polymer fiber mats of claim 2, nor does Hummerich et al provide any motivation or reason to modify Chang et al and/or Taylor et al as the Examiner urges would be obvious. The objective of Hummerich et al is to provide formaldehyde free binders for fibers to avoid formaldehyde emissions, see col. 1, lines 26-28 and col. 2, lines 12-27, particularly lines 18-20. By teaching formaldehyde free, thermoset resin binders, Hummerich et al teach away from the claimed invention. Further, Hummerich et al do not address the problem addressed by the claimed invention, i.e. producing a fibrous mat of polymer fibers having a hot strength in the fibrous mat at 200 degrees C. of no more than 1 percent elongation in the machine direction and therefore there is no motivation in Hummerich et al to modify Chang et al and/or Taylor et al with its teachings.

While Hummerich et al do teach in col. 10, lines 9-13 that their formaldehyde free, thermoset resin binders can be used along with other binders like urea formaldehyde resins, melamine formaldehyde resins and phenol formaldehyde resins, all thermosetting resins, Hummerich et al provides no motivation for doing so, and further this teaching would not lead one of ordinary skill to the formaldehyde containing polymer binders, also containing bisulfite, recited in claim 2. This rejection appears to be one of hindsight after having the benefit of applicant's disclosure, and such is improper. For these reasons, applicant believes that claim 2 is patentable under 35 USC 103 and that the Board should reverse this rejection.

d) Re: VI (d) – Rejection of Claims 8-10 under 35 USC 103(a)

Claims 8-10 depend from claims 1, 2 and 3 respectively and limit the formaldehyde containing polymer resin to an emulsified styrene butadiene acrylonitrile copolymer latex. The impropriety of the rejection of these claims under

35 USC 103(a) based on the combination of the teachings of Chang et al and Taylor et al are set out in the section VI(b) above and are again relied on against this rejection of claims 8-10. The Examiner stated that in addition to the combination of teachings of Chang et al and Taylor et al, the mats of these claims are obvious in view of the additional teachings of Nishibara et al. Applicant disagrees and respectfully requests the Board to reverse this rejection.

The Examiner states that Nishibara et al teach that SBR and acrylonitriles are well known common rubbers for polymer fibers (col. 2, lines 20-65 and that it would have been obvious in the sense of 35 USC 103 to have used SBR acrylonitrile fibers in place of polyester fibers taught by Chang et al.

This rejection is in error first because claims 8-10 relate to the polymer binder, not the polymer fibers, and require that the binder is a formaldehyde containing, fortified and emulsified styrene butadiene acrylonitrile copolymer latex. Second, maybe the Examiner mistook the paragraph in col. 2, lines 44-65 as referring to the fibers in lines 29-43, but actually resins and rubbers used as matrices, i.e. binders. But, nothing in Nishibara et al teach or reasonably suggest modifying Chang et al and/or Taylor et al to produce the nonwoven mats of claims 8-10.

Nishibara et al begins with a fiber reinforced resin sheets, well known and widely used, col. 2, lines 9-11 and col. 6, lines 18-34 (containing 45 wt. percent resin) and does not teach or reasonably suggest nonwoven mats as claimed in claim 1 containing only about 16-30 wt. percent matrix or binder. Instead, Nishibara et al teach laminating such well known fiber reinforced resin sheets with a layer of thermoplastic sheet on each side of the fiber reinforced resin sheet and then passing the laminate between heated rollers and a stretching device to produce thin sheets having an even higher, but undisclosed resin content, see the Abstract and claim 1. Nishibara et al do not teach making the kind of mats taught by Chang et al and do

not suggest how to produce a polymer fiber nonwoven mat having a hot strength of less than 1 percent elongation at 200 degrees C., nor does it teach or reasonably suggest modifying Chang et al by removing urea formaldehyde from the binder to make nonwoven mats having a binder content of 16-30 wt. percent. In summary, Nishibara et al teach a very different type of product containing different materials or different amounts of same materials made by different methods and teach a very different solution to a very different problem and therefore would not lead one of ordinary skill in the art to modify Chang et al and/or Taylor et al to arrive at the mats of claims 8-10. For these reasons applicant believes the Board should reverse this rejection.

VII (e) Other informality:

Re the inadvertently overlooked semi-colon in line 10 of claim 1, upon the reversal of all of the above rejections, the Examiner is given the authority by applicant to replace the semi-colon mentioned in the Advisory Action, Continuation of 11, in line 10 (or 11) of claim 1, with a comma by Examiner's Amendment.

VIII. Claims Appendix

See attached Claims Appendix for a copy of the claims involved in this appeal.

IX. Evidence Appendix

See the attached Evidence Appendix for copies of the evidence relied on by appellant.

X. Related Proceedings Appendix

See the attached Related Proceedings Appendix – appellant knows of no related proceedings that would affect this appeal.

Respectfully submitted,


Attorney for Applicants

Robert D. Touslee
Registration No. 34,032
303-978-3927

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VIII. Claims Appendix

The Appealed Claims:

1. A nonwoven fibrous mat having a basis weight in the range of about 50 – 225 grams/square meter, fibers in the fibrous mat consisting essentially of polymer fibers bound by about 16-30 wt. percent, based on the dry weight of the mat, of a formaldehyde containing polymer resin latex binder, the polymer of the polymer resin latex binder being selected from a group consisting of ethylene-vinyl acetate copolymer, styrene-acrylic copolymer, vinyl-acrylic copolymer, styrene-butadiene-acrylonitrile copolymer, acrylic copolymer prepared by emulsion polymerization of one or more acrylic ester monomers including ethyl acrylate, methyl acrylate, methyl methacrylate, butyl acrylate, 2-ethyl hexylacrylate, hydroxyethyl acrylate, hydroxypropyl acrylate, and hydroxyethyl methacrylate; acrylamide or substituted acrylamides, butadiene, styrene, acrylonitriles, vinyl acetate or other vinyl esters; carboxylic acid monomers or ethylenically unsaturated anhydrides capable of generating carboxylic acids, the binder containing a bisulfite compound providing a hot strength in the mat, at 200 degrees C., of no more than about 1 percent elongation, in the machine direction, the binder containing at least about 1.25 wt. percent and up to about 7.5 wt. percent of the bisulfite compound, based on the dry weight of the formaldehyde containing resin in the binder.

2. The mat of claim 1 wherein the polymer resin latex binder is selected from formaldehyde fortified latex polymers, the polymers selected from a group consisting of ethylene-vinyl acetate copolymer, styrene-acrylic copolymer, vinyl-acrylic copolymer, styrene-butadiene-acrylonitrile copolymer, and acrylic copolymer.
3. The mat of claim 2 wherein the bisulfite is ammonium bisulfite in amounts of about 2.5–7.5 wt. percent.
4. The mat of claim 1 wherein the bisulfite is ammonium bisulfite in amounts of about 2.5–7.5 wt. percent.
5. The mat of claim 1 wherein the bisulfite compound is present in an amount of at least about 2.5 wt. percent.
6. The mat of claim 2 wherein the bisulfite compound is present in an amount of at least about 2.5 wt. percent.
7. The mat of claim 3 wherein the bisulfite compound is present in an amount of at least about 5 wt. percent.
8. The mat of claim 1 wherein the binder is an emulsified styrene butadiene acrylonitrile copolymer latex.
9. The mat of claim 2 wherein the binder is an emulsified styrene butadiene acrylonitrile copolymer latex.
10. The mat of claim 3 wherein the binder is an emulsified styrene butadiene acrylonitrile copolymer latex.

11. The mat of claim 8 wherein the polymer fibers are polyester, the bisulfite compound is ammonium bisulfite, the binder content of the web is in the range of about 16-24 wt. percent and the basis weight of the web is in the range of about 150-200 gms/sq. meter.

12. The mat of claim 9 wherein the basis weight is in the range of about 50 – 175 grams per square meter, the polymer fibers are polyester, the bisulfite compound is ammonium bisulfite in an amount in the range of about 2.5 – 7.5 wt. percent, the binder content of the web is in the range of about 16-24 wt. percent and the basis weight of the web in the range of about 150-200 gms/sq. meter.

13. The mat of claim 5 wherein the polymer fibers are polyester, the bisulfite compound is ammonium bisulfite, the binder content of the web is in the range of about 16-24 wt. percent and the basis weight of the web is in the range of about 150-200 gms/sq. meter.

IX. Evidence Appendix

1. Exhibit, of record – Title page and pages 25-27 of the book, FIBER GLASS by J. Gilbert Mohr and William P. Rowe, published by Van Nostrand Reinhold Co., 1978. (Copy attached)

2. Rule 1.132 Declaration by Ralph Michael Fay, of record. (Copy attached)

FROM : TECSECO J MILLER

FAX NO. : 303 766 2329

Apr. 24 2007 08:42AM P1

Exhibit

FIBER GLASS

J. Gilbert Mohr

Johns-Manville Sales Corporation
Process Development Division, Waterville, Ohio
and

William P. Rowe

Johns-Manville Sales Corporation
Filtration and Industrial Minerals Division, Waterville, Ohio



VAN NOSTRAND REINHOLD COMPANY
NEW YORK CINCINNATI ATLANTA DALLAS SAN FRANCISCO
LONDON TORONTO MELBOURNE

FROM : TEC SERCO J MILLER

FAX NO. : 303 766 2329

Apr. 24 2007 08:42AM P2

24 FIBER GLASS



Fig. 3-6. The method of burn-off at an intermediate temperature which removes the organic binder but does not change the glassy mass. Percent weight loss is then calculated.

plied to glass wool products may be evaluated by color (light or pinkish tan—probable undercure, unless artificially colored; dark tan to brown—good cure), by acetone extraction, water absorption, or degree of thickness recovery of the product after prolonged compression. Silicones are evaluated by surface (wetting) angle, and the other ingredients by specific quality and performance tests called out in their manufacturer's specifications.

The amount of binder present is a valuable control parameter and is determined by ignition at 1050°F of a dry, cured resin-glass sample and then calculating the percent weight loss (see Fig. 3-6).

Thickness and Density

These two parameters are so closely interrelated that, in the manufacturing process, a change in one invariably produces a compensating modification in the other. If a machine is producing at 1 in. thickness and 1 lb/cu ft density, and the thickness is doubled to 2 in., the density per inch of thickness would be halved. Hence, the quantity of fiber input to the machine must be doubled to maintain the

FROM : TECSECO J MILLER

FAX NO. : 303 766 2329

Apr. 24 2007 08:43AM P3

FIBER GLASS BLOWN WOOL OR INSULATION PRODUCTS 25

product at 1 lb density. Since a near-uniform fiber production rate is desirable, the required gain in the fiber input per unit area is accomplished by halving the machine speed, thereby permitting twice as much fiber to accumulate.

In the manufacture of wool fiber, thickness is usually controlled by raising or lowering a set of "flights" or flat segmented elements on a chain drive which contact and compress the top surface. These move at the same speed as the bottom or collecting open-mesh conveyor. The flights are also constructed of an expanded metal or other open-mesh material to permit passage of heated air in the forced-draft curing oven.

Ultimate or specified thickness values of glass fiber and associated wool products are determined by the Gustin-Bacon "measurmatic" null-balance device (see Fig. 3-7). In this unit the pressure of only a 3 g weight (to depress the few protruding surface fibers) is exerted by a plate which contacts the top of the test sample. Thicknesses vary in fiber glass end products from $\frac{1}{8}$ in. to as much as 8 in. *

The accompanying density in blown fiber glass wool products is determined solely by weight of a sample 1 sq ft in area. Density may be made to vary from $\frac{1}{2}$ lb to as much as 7 lb/cu ft in some board



Fig. 3-7. Counterweighted null balance used to measure thickness of wool products as manufactured.

FROM :TECSERCO J MILLER

FAX NO. :303 766 2329

Pr. 24 2007 08:43AM P4

26 FIBER GLASS

products. The upper limit on the flexible roll goods is approximately $2\frac{1}{2}$ lb/cu ft.

Hence it can be seen that many combinations of wool thickness and density are possible. Most product applications are based upon the best combination of the two to fulfill requirements of thermal, acoustical, or other service with performance balanced against cost. The close and necessary relationship between thickness and density will become more evident in the ensuing descriptions of individual products and their performance. (Fiber glass product density should not be confused with glass density mentioned earlier. Glass density refers to the factor of increase of the solid glass substance over the weight of an equivalent volume of water taken as unity.)

Percent Shot

As indicated, some of the processes generate a larger percentage of glassy beads or "shot" than others. The shot is often mobile, that is, not attached or adhered to adjoining fibers. Hence it may be removed by mechanical manipulation of a sample and weighed as a quality determination.

* Percent Recovery

The degree of recovery after compression in insulation or wool products relates directly to the thickness which the manufacturer guarantees in his finished product specifications. The specifications for the product you want to purchase must be met under any and all conditions.

An austere condition exists in manufacture and packaging of either flat or roll-type insulation products. Unfortunately, they are usually compressed to conserve shipping space.

It would be most disconcerting to allow a 3 in. construction space for insulation, and when the material arrived for installation, find that it filled only a portion of the allotted space. In such an instance, naturally, the thermal efficiency and resistance to heat flow would be different than that originally designed for the building. Therefore, the industry sets and maintains rigid standards for recovery of the products to specified values.

The percent thickness recovery is influenced by the following: the original flight setting (usually original production thicknesses are

FROM : TECSECO J MILLER

FAX NO. : 303 766 2329

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FIBER GLASS BLOWN WOOL OR INSULATION PRODUCTS 27

slightly over specification); thickness itself (greater thicknesses generally have lower percent recovery); density (lower density-lower recovery); tightness of compression, rollup, etc., in packaging for shipment; type, age, formulation, and degree of cure of the bonding resin; and degree of relative humidity in the storage area (packaged insulation should be sealed inside non-moisture-transferring membranes).

Other Properties

Other functions of fiber glass and related mineral wool products such as resistance to heat transmission (thermal insulation), acoustical or sound absorption, "efficacy" as a filtration medium, and others will be detailed in the ensuing discussions of specific product applications and performances.

BUILDING INSULATION**Thermal Insulation—Homes**

Insulation of homes against heat loss (winter) and heat gain (summer) probably represents the largest single usage for fiber glass and mineral wool products. Many different areas of the home may be thermally protected: ceilings, sidewalls, perimeters of slabs, floors, etc. Not only are many different types of available insulating materials used, but the way various components perform in combination must be taken into consideration in analyzing for the complete insulated structure, either in retrofitting or in new construction.

An understanding of the way insulation performs should start with consideration of the basic units of heat and related definitions.

HEAT LOSS DATA AND CALCULATIONS

(Reprinted from Johns-Manville Engineering Data on Building Products, #39Q, Feb. '75 or #FGBI-1, Nov. '75).

In the United States the basic unit of heat is generally considered to be the British Thermal Unit or, as it is commonly called, a Btu.

BRITISH THERMAL UNIT (Btu)—the amount of heat required to increase the temperature of one pound of water one deg Fahrenheit.

The basic unit of heat flow: i.e. the amount of heat that will be transmitted through a unit of material in a given time, is known as the thermal conductivity of a material.

**RECEIVED
CENTRAL FAX CENTER****OCT 23 2007****IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of: Miele

Art Unit: 1774

Serial No. 10/647,917

Case Docket No. 7170

Filed: August 26, 2003

Examiner: Merrick L. Dixon

April 23, 2007

For: **LOW EMISSION FIBROUS MATS HAVING HIGH HOT STRENGTH**

Commissioner of Patents and Trademarks

Washington, D. C.

Dear Sir:

Rule 1.132 Declaration

I, Ralph Michael Fay, having an address of 2249 S. Hoyt Ct., Lakewood, Colorado 80227, am trained as a chemist and material scientist and have 28 years experience in fiber glass wool insulation processes and products. I have been employed for 28 years by Johns Manville International, Inc., the assignee of the instant application and before that worked for 2 years with continuous fiber glass reinforcements and polyurethane foam insulation with McDonnell Douglas Astronautics Company in Huntington Beach, California. I am also familiar with nonwoven fibrous mats of the type claimed in the instant application.

I have studied U.S. Patent No. 5,578,371, Taylor et al, and am familiar with the invention of the instant application and have made the following conclusions:

1) The products disclosed in Taylor are fiber glass wool thermal and acoustic insulation blanket and mat products as evidenced by the following:

a) One of ordinary skill in fiber glass thermal insulation products would understand that the mat mentioned by Taylor et al is quite different than the nonwoven mats of the above named patent application in that the Taylor et al mat comprises staple glass wool fibers bound together with a resin and is both compressible for packaging, storage and shipment, and very different in physical properties required for performance. For example, important properties of the nonwoven fibrous mats of the above named application include tensile strength, tear strength, thermal dimensional stability and thickness in mills while many of these properties are not even measured in insulation products like those disclosed in Taylor et al. Also, the end uses of the products of Taylor et al are quite different than those of the nonwoven fibrous mats of the above named application. The Taylor et al products are used for thermal and/or acoustical insulation while nonwoven fibrous mats are used for reinforcing and stabilizing asphalt, polymers and concrete products. The physical property requirements of these two different types of products and applications are very different and properties like recovery and droop, very important in insulation products, are not a factor in nonwoven fibrous mats of the above named application.

b) Col. 1, lines 32-39, of Taylor et al, describes the type of products the invention is involved with. In this disclosure, Taylor et al state that these types of products are often shipped in a compressed form, and that it is imperative that the fiber glass wool product recover all or most of its original thickness after the package is opened. The nonwoven mat products of the claimed invention are not shipped in the kind of compressed state as the products of

Taylor et al, and recovery is not a property measured or discussed in the products of the invention of the above named application.

c) Col. 4, lines 59-62, of Taylor et al, states that the binder of the invention is sprayed on hot fiberglass during fiberglass blanket or mat formation. This is typical of a fiber glass wool insulation operation. The glass fibers made for insulation wool products are of various diameters down to sub-micron and up to about 10 microns or so and usually average about 5 microns, much smaller than the fibers in the nonwoven mats of the claimed invention. These fibers are of various lengths from very short to several inches long or longer, very unlike the fibers in the mats of the claimed invention. Also, glass wool fiber of the type taught by Taylor et al is substantially different in surface characteristics than polymer fibers.

d) Col. 6, lines 18-23, of Taylor et al states that the binder spray nozzles are located about 12 inches or so below a fiber glass spinning machine, i. e. a rotary spinner, used to produce glass wool fibers from a molten glass, such that the binder spray is applied to the hot fibers. This is a typical fiber glass wool making operation, see pages 12, 13, 17, and 18 of FIBERGLASS by Mohr and Rowe, attached, and see col. 1, lines 23-24 of Taylor. Such a process and the products these processes make it very different than the nonwoven polymer fiber mats of the invention of the above named application, and the method for making them.

For the above reasons, in my opinion, one skilled in the insulation art would not consider that Taylor et al refers to nonwoven fibrous mats, the latter being a term of art identifying products very different than the insulation products of Taylor et al.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Signed Ralph Michael Tony

Date 4/23/07

Address: 2249 S. Hoyt Ct.
Lakewood, CO 80227

X. Related Proceedings Appendix

NONE